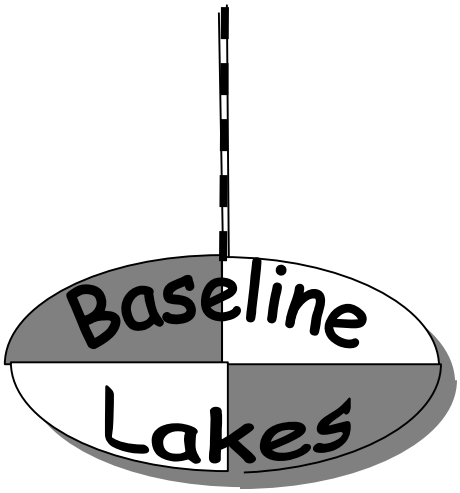
Nashua River Watershed Lakes Data
***excerpted from*:**

Baseline Lake Survey 2003
Technical Memo



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Baseline Lake Survey 2003
Technical Memo

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Massachusetts Department of Environmental Protection
Division of Watershed Management
Worcester, MA

Data for lakes sampled in the Nashua River Watershed are excerpted from the original technical memorandum and are provided below. All methods (field and laboratory) and results (QA/QC, lab audits, field blanks, duplicates and splits) are included in the original technical memorandum and are available upon request to the MassDEP DWM.

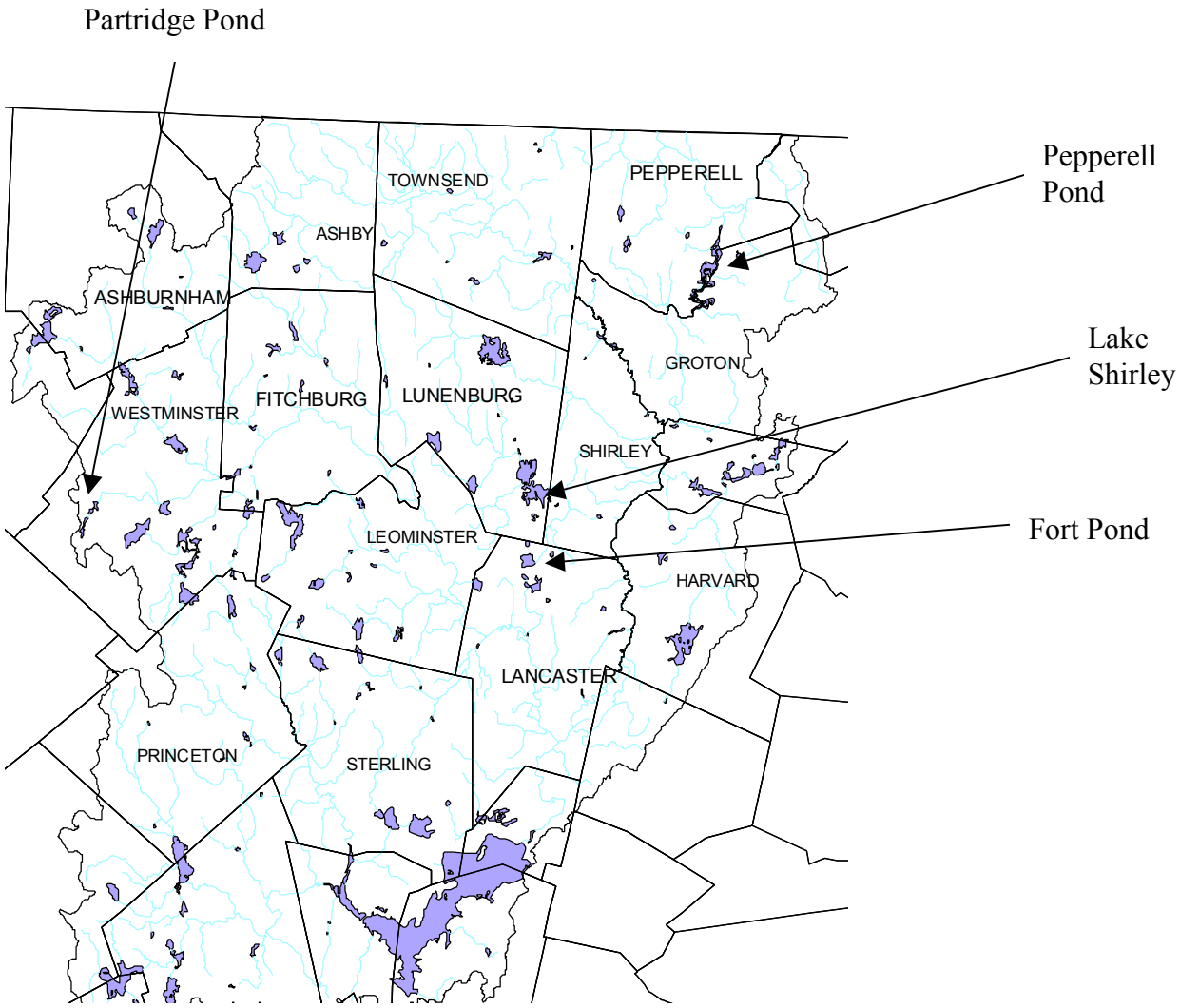

Figure 1. Nashua Basin Lakes (Pepperell Pond).

Data results:

The final 2003 Nutrient Criteria Lakes and Baseline Lakes multiprobe data are presented in Table 1 and Table 2 below followed by the final water quality data presented in Table 3 and Table 4. Electronic versions of the final data files are available from the MassDEP (file w:\dwm\assess\dwm-data\2003). Locus maps for lakes can be found in DWM SOP directory (SOP CN165.2) and USGS local environ maps in PALIS order are presented in Appendix IV.

Compared to the 2002 survey, many of 2003 survey lakes were deeper (nutrient criteria lakes e.g., Lake Shirley, Fort Pond are ~12m deep, while Lake Quinsigamond was the deepest at 25.1m). We noticed some lakes (e.g., Lake Garfield, Manchaug and Laurel Lake) mixing to 5 meters by the Sept. 17 end of survey date. Shallow lakes were either mixing to the bottom with no stratification or were stratified at a shallow depth e.g., 2m in Sherman Pond.

Hydrologic summary: According to the USGS water report (USGS 2003) runoff was generally normal and below normal over most of Massachusetts from June 2002 – September 2003. During the summer months of June- September for water year 2003, the southeast and western Massachusetts were usually above normal (upper 25%) in runoff, while central and northeast Massachusetts were generally normal in runoff (Socolow et, al 2004).

Secchi disk transparency for the Nutrient Criteria lakes ranged from poor to very clear (0.7m – 5.8m). The results of Secchi disk transparency measurements (Table 3 below) show that four of the lakes had relatively good transparency (very clear) with Secchi disk readings > 5 meters (Fort Pond). However, 16 of the 42 nutrient criteria lakes surveyed showed Secchi disk readings less than 2.5 meters. In many cases surprisingly little relationship was observed between TP and chlorophyll-a. This discrepancy might be explained by some highly colored lakes.
Aquatic plant maps were completed in twenty lakes. Fort Pond had no exotic species noted. *Lythrum salicaria* was noted in Pepperell Pond. Also *Trapa natans* was noted in Pepperell Pond. In addition *Myriophyllum heterophyllum* was found in Partridge Pond. Small patches of *Potamogeton crispus* were noted in Pepperell Pond. In Pepperell Pond *Potamogeton crispus* was noted to be possibly dominant early in season. Maps of the plant surveys and depth maps (if completed) are presented below.

A key to the macrophyte species is available in Appendix I. Hardcopies of the original macrophyte maps are kept at DWM and depth maps can be found in W:DWM\temp\bathymetric maps.

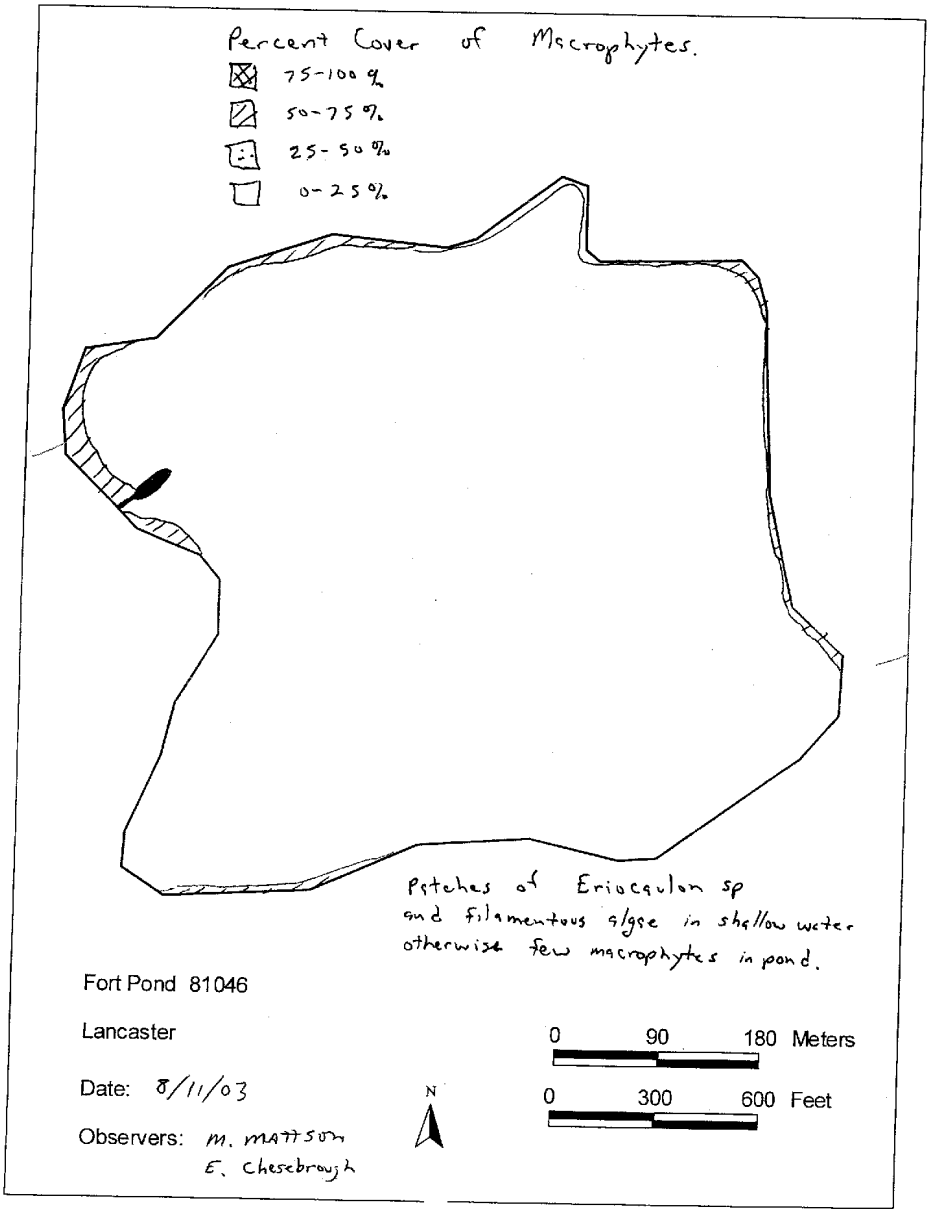

Figure 2. Fort Pond percent Cover Map.

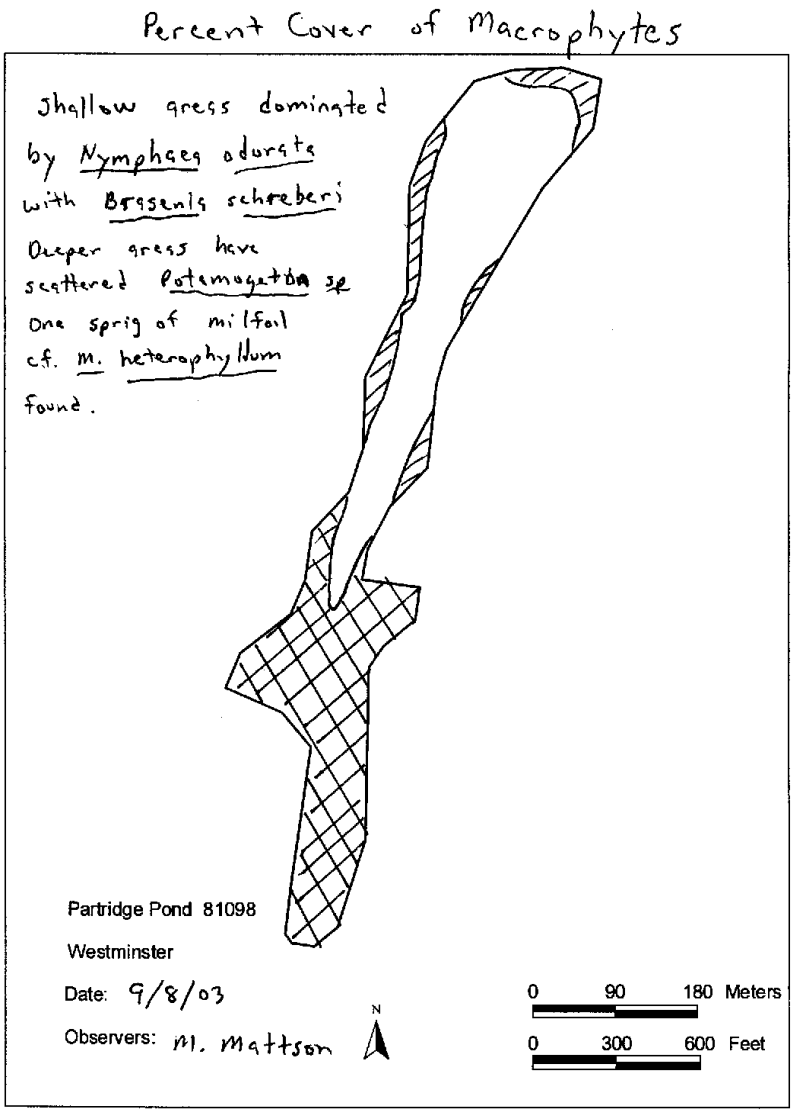

Figure 3. Partridge Pond Macrophyte Density Map.

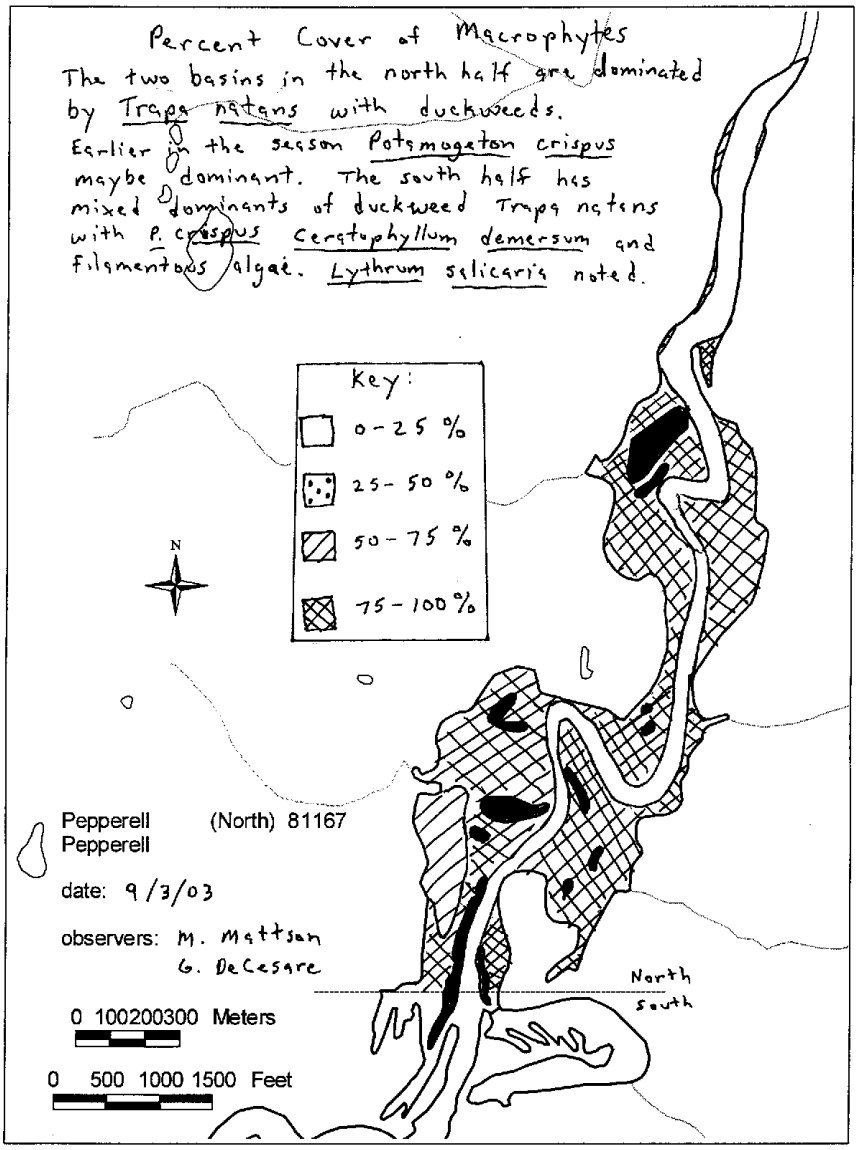

Figure 4. Pepperell Pond North Percent Cover Map.

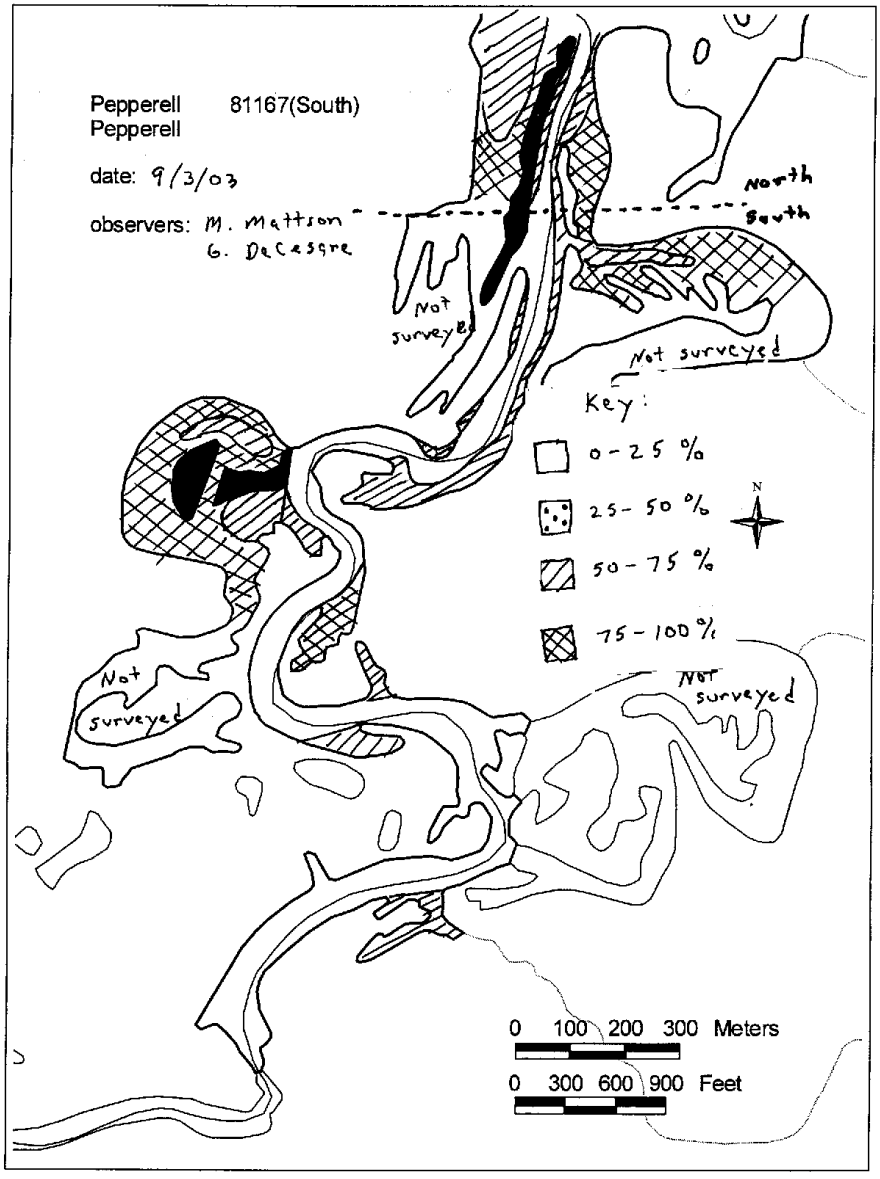

Figure 5. Pepperell Pond South Percent Cover Map.

Table 1. Multiprobe Data for 2003 Nutrient Criteria Lakes

Nutrient Criteria, Lakes (2003) (QC Status: 4) Exported: 10/4/2005 11:38:18 AM

Fort Pond (PALIS: 81046)
Unique_ID: W0603 Station: ~deep hole
Description: [Fort Pond, Lancaster.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
08/11/03									
	LC-0189	11:00	0.5	26.2	7.4 c	373	239	8.1	101
	LC-0189	11:08	2.0	26.0	7.4 c	373	239	8.1	101
	LC-0189	11:21	3.5	22.3	6.8	376	241	8.0 u	94 u
	LC-0189	11:30	5.0	13.3 u	6.6	359	230	8.2 u	79 u
	LC-0189	11:36	6.5	9.1	6.4	357	229	6.3 u	56 u
	LC-0189	11:49	8.0 m	7.2 um	6.3 um	372 m	238 m	4.2 um	35 um
	LC-0189	11:57	11.0	5.7	6.4	526 u	336 u	<0.2 u	<2 u

Partridge Pond (PALIS: 81098)
Unique_ID: W1088 Station: A
Description: [deep hole, northern end, Westminster]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
09/08/03									
	LC-0195	11:34	0.5	20.4	6.2	104	66.5	7.3 u	82 u
	LC-0195	11:41	1.7	19.9	6.0	103	66.2	6.3	70

CATACOONAMUG BROOK/Lake Shirley (SARIS: 8144525) (PALIS: 81122)
Unique_ID: W1089 Station: A, Mile Point: 3.096
Description: [deep hole, southeastern lobe, Lunenburg]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
09/16/03									
	LC-0203	11:47	0.5	23.1 u	7.5 cu	243	155	8.6	102
	LC-0203	11:53	1.5	22.0	7.3 c	241	154	8.0 u	93 u
	LC-0203	11:56	2.4	21.5	7.0 c	241	154	6.8	79
	LC-0203	12:01	3.5	21.0	6.9 c	246	158	6.3 u	71 u
	LC-0203	12:08	4.5	18.9 u	6.5	243 u	156 u	1.0 u	11 u
	LC-0203	12:12	6.1	11.6 u	6.6 u	245 u	157 u	0.2	2
	LC-0203	12:18	7.5	7.8 u	6.7 u	267 u	171 u	0.2	2
	LC-0203	12:23	9.0	6.8	6.9 c	272 u	174 u	0.3	2
	LC-0203	12:28	10.1	6.6	7.0 c	276 u	177 u	0.3	2
	LC-0203	12:32	11.1	6.5	7.0 c	283	181	0.3	2

Table 2. Multiprobe Data for 2003 TMDL Baseline Lakes

TMDL Baseline Lakes (2003) (QC Status: 4) Exported: 10/4/2005 11:38:21 AM

NASHUA RIVER/Pepperell Pond (SARIS: 8143500) (PALIS: 81167)
Unique_ID: W1074 Station: A, Mile Point: 4.343
Description: [deep hole, Pepperell]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
07/15/03									
	LB-2515	10:42	0.5	21.0 u	6.8	258	165	6.8	77
	LB-2515	10:46	1.5	21.0	6.8	259	166	6.8	77
	LB-2515	10:55	2.5	20.9	6.8	259	165	6.6	75
	LB-2515	11:02	3.5	20.9	6.8	258	165	6.6	75
	LB-2515	11:09	4.5	20.9	6.8	258	165	6.6	74
	LB-2515	11:13	5.5	20.9	6.8	258	165	6.5	74
	LB-2515	11:17	6.2	20.8	6.8	258	165	6.5	73
08/13/03									
	LB-2684	09:53	0.5	23.0	6.7	241	154	5.8 u	68 u

	LB-2684	09:58	1.5	23.0	6.8	242	155	5.8	67
	LB-2684	10:03	2.5	22.9	6.8	241	154	5.7	67
	LB-2684	10:10	3.5	22.9	6.8	241	154	5.7	67
09/16/03									
	LB-2685	14:19	0.4	19.3	6.7	257	165	8.0 u	88 u
	LB-2685	14:25	1.5	19.3	6.7	256	164	7.8	85
	LB-2685	14:30	2.4	19.2	6.7	253	162	7.8	86
	LB-2685	14:34	3.5	19.1	6.7	251	161	7.7	85
	LB-2685	14:38	4.5	19.1	6.7	258	165	7.7	84
	LB-2685	14:44	5.5	19.1	6.7	253 u	162 u	7.7	85
	LB-2685	14:48	6.0	19.1	6.7	254	162	7.7	85

General Data Symbols :

" ## " = Censored data (i.e., data that has been discarded for some reason). *NOTE: Prior to 2001 data, "**" denoted either censored or missing data.*

" ** " = Missing data (i.e., data that should have been reported). See NOTE above.

" -- " = No data (i.e., data not taken/not required)

* = Analysis performed by Laboratory OTHER than MassDEP's Wall Experiment Station (WES)

[ ] = A result reported inside brackets has been "censored", but is shown for informational purposes (e.g., high blank results).

Multi-probe-specific Qualifiers:

" i " = inaccurate readings from Multi-probe likely; pre/post-survey calibration problems etc.

" m " = method not followed; one or more protocols contained in the MassDEP Multi-probe SOP not followed, ie. operator error or instrument failure not allowing method to be implemented.

" s " = field sheet recorded data were used to accept data, not data electronically recorded in the Multi-probe surveyor unit, due to operator error or equipment failure.

" u " = unstable readings, due to lack of sufficient equilibration time prior to final readings, non-representative location, highly-variable water quality conditions, etc. See Section 4.1 for acceptance criteria.

" c " = greater than calibration standard used for pre-calibration, or outside the acceptable range about the calibration standard. It can also be used for TDS and Salinity calculations based on qualified ("c") conductivity data, or that the calculation was not possible due to censored conductivity data (TDS and Salinity are calculated values and entirely based on conductivity reading).

" r " = data not representative of actual field conditions.

Table 3. Water Quality Data for Nutrient Criteria Lakes.

Nutrient Criteria, Lakes (2003) (QC Status: 4) Exported: 10/14/2005 12:03:13 PM

Fort Pond (PALIS: 81046)
Unique_ID: W0603 Station: ~deep hole
Description: [Fort Pond, Lancaster.]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	Sample Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr		m	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
08/11/03	5.3	11:22	14.7											
				LC-0186	--	11:15	VDOR	14.0	--	--	--	--	##* mr	--
				LC-0184	LC-0185	10:55	MNGR	<0.5	--	--	--	--	##* m	15*
				LC-0185	LC-0184	10:55	MNGR	<0.5	--	--	--	--	##* m	<15*
				LC-0188	LC-0281	11:50	DINT	0 - 7.0	4.1*	--	--	--	--	--
				LC-0281	LC-0188	11:52	DINT	0 - 7.0	4.1*	--	--	--	--	--

Partridge Pond (PALIS: 81098)
Unique_ID: W1088 Station: A
Description: [deep hole, northern end, Westminster]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	Sample Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr		m	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
09/08/03	2.0	11:15	2.2											
				LC-0192	--	11:40	VDOR	1.7	--	<0.02	--	0.41 bh	0.018	--
				LC-0191	--	11:15	MNGR	<0.5	--	<0.02	--	0.42 bh	0.013	38*
				LC-0193	LC-0194	11:30	DINT	0 - **	3.9*	--	--	--	--	--
				LC-0194	LC-0193	11:40	DINT	0 - **	4.3*	--	--	--	--	--

CATACOONAMUG BROOK/Lake Shirley (SARIS: 8144525) (PALIS: 81122)
Unique_ID: W1089 Station: A, Mile Point: 3.096
Description: [deep hole, southeastern lobe, Lunenburg]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	Sample Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr		m	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
09/16/03	3.8	11:20	**											
				LC-0200	--	11:30	VDOR	11.0	--	<0.02	--	## bh	0.090 bh	--
				LC-0198	LC-0199	11:26	MNGR	<0.5	--	<0.02	--	## bh	0.019	19*
				LC-0199	LC-0198	11:26	MNGR	<0.5	--	<0.02	--	## bh	0.022	19*
				LC-0202	--	11:42	DINT	0 - 8.0	13.4*	--	--	--	--	--

Table 4. Water Quality Data for Baseline Lakes.

TMDL Baseline Lakes (2003) (QC Status: 4) Exported: 10/14/2005 12:03:14 PM

NASHUA RIVER/Pepperell Pond (SARIS: 8143500) (PALIS: 81167)

Unique_ID: W1074 Station: A, Mile Point: 4.343

Description: [deep hole, Pepperell]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	Sample Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr		m	mg/m3	mg/L	mg/L	mg/L	mg/L	mg/L	PCU
07/15/03	2.8	10:55	6.7												
				LB-2512	--	11:10	VDOR	6.2	--	--	--	--	--	##* m	--
				LB-2510	LB-2511	10:41	MNGR	<0.5	--	--	--	--	--	##* m	28*
				LB-2511	LB-2510	10:41	MNGR	<0.5	--	--	--	--	--	##* m	31*
				LB-2514	--	11:05	DINT	0 - 6.2	4.3*	--	--	--	--	--	--
08/13/03	2.7	10:00	3.8												
				LB-2681	--	10:15	VDOR	3.0	--	--	0.50	0.40	--	##* m	--
				LB-2682	LB-2683	10:10	DINT	0 - 3.0	3.9*	--	--	--	--	--	--
				LB-2683	LB-2682	10:12	DINT	0 - 3.0	3.7*	--	--	--	--	--	--
				LB-2680	--	10:20	MNGR	<0.5	--	--	0.50	0.42	--	##* m	35*
09/16/03	3.7	14:05	6.4												
				LB-2545	--	14:10	VDOR	6.0	--	--	0.78	--	1.2 h	0.045 h	--
				LB-2544	--	14:07	MNGR	<0.5	--	--	0.77	--	1.2 h	0.041 h	20*
				LB-2546	LB-2547	14:15	DINT	0 - 6.0	1.9*	--	--	--	--	--	--
				LB-2547	LB-2546	14:15	DINT	0 - 6.0	1.4*	--	--	--	--	--	--

Sample-Specific Data Qualifiers:

" a " = accuracy as estimated at WES Lab via matrix spikes, PT sample recoveries, internal check standards and lab-fortified blanks did not meet project data quality objectives identified for program or in QAPP.

" b " = blank Contamination in lab reagent blanks and/or field blank samples (indicating possible bias high and false positives).

" d " = precision of field duplicates (as RPD) did not meet project data quality objectives identified for program or in QAPP. Batched samples may also be affected.

" e " = not theoretically possible. Specifically, used for bacteria data where colonies per unit volume for e-coli bacteria > fecal coliform bacteria, for lake Secchi and station depth data where a specific Secchi depth is greater than the reported station depth, and for other incongruous or conflicting results.

" f " = frequency of quality control duplicates did not meet data quality objectives identified for program or in QAPP.

" h " = holding time violation (usually indicating possible bias low)

" j " = 'estimated' value; used for lab-related issues where certain lab QC criteria are not met and re-testing is not possible (as identified by the WES lab only). Also used to report sample data where the sample concentration is less than the 'reporting' limit or RDL and greater than the method detection limit or MDL (mdl< x <rdl). Also used to note where values have been reported at levels less than the mdl.

" m " = method SOP not followed, only partially implemented or not implemented at all, due to complications with sample matrix (eg. sediment in sample, floc formation), lab error (eg. cross-contamination between samples), additional steps taken by the lab to deal with matrix complications, lost/unanalyzed samples, and missing data.

" p " = samples not preserved per SOP or analytical method requirements.

" r " = samples collected may not be representative of actual field conditions, including the possibility of "outlier" data and flow-limited conditions (e.g., pooled).

Key to data codes:
" ## " = Censored data; " ** " = Missing data; " -- " =No data; "*" =other lab;
SymTyp: Sample Type- VDOR= Van Dorn; DINT= Depth integrated by vertical hose; MNGR= Manual Grab; NR= not recorded.

References

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USGS, 2004. Socolow, R.S., J.S. Whitney, D. Murino Jr., and L.R. Ramsbey. Water Resources Data Massachusetts and Rhode Island Water Year 2003. Water-Data Report MA-RI-00-1. USGS, Northborough, MA 01532.

Appendix I. Macrophyte Species Codes.

Plant species (common name)	Code	Plant species (common name)	Code
Macroscopic algae (mats, clumps, etc.)	Δ	Najas sp. "Bushy Pondweed" or Naiad"	J
Chara sp. "Muskgrass"	Δ1	Ruppia maritima "Widgeon Grass"	J1
Nitella sp. "Stonewort"	Δ2	Najas flexilis "Slender Naiad"	J2
Bryozoan	Δ3	Najas minor "European Naiad"	J3
		Najas guadalupensis "Naiad"	J4
Moss		Najas gracillima	J5
Riccia fluitans "Slender Riccia"	M1		
Ricciocarpus natans "Purple-fringed Riccia"	M2		
		Alisma sp. "Water-Plantain"	A1
Other aquatic ferns	N	Echinodorus sp. "Burhead"	A2
Osmunda regalis "Royal Fern"	N1	Sagittaria sp. "Arrowhead" or "Duck Potato"	A3
Marsilea quadrofolia "Pepperwort"	N2	Sagittaria sp. (submerged form only)	A4
Azolla caroliniana "Water-velvet"	N3	S. latifolia "Common Arrowhead"	A5
Salvinia rotundifolia "Floating Moss"	N4	S. rigida "Stiff Arrowhead"	A6
		S. teres "Dwarf Wapato	A7
Isoetes sp. "Quillwort"	I	S. graminea "Grassy Arrowhead"	A8
I. tuckermani "Quillwort"	I1		
		Vallisneria americana "Wild Celery" or "Tape Grass"	H1
Typha latifolia "Common Cattail"	T	Elodea sp. "Waterweed"	H2
Typha angustifolia "Narrow-leaved Cattail"	T1	E. nattallii "Waterweed"	H3
Typha glauca "Hybrid Cattail"	T2	E. canadensis "Canadian Waterweed"	H4
		Egeria densa "Brazilian elodea"	H5
Sparganium sp. "Bur Reed"	S	Gramineae (Grass Family)	G
S. fluctuans "Water Bur Reed"	S1		
S. eurycarpum "Giant Bur Reed"	S2	Cyperus sp. "Flat Sedge"	Y1
S. americanum "Bur Reed"	S3	Dulichium arundinaceum "Three-way Sedge"	Y2
		Fimbristylis sp. "Fimbristylis"	Y3
Potamogeton sp. "Pondweed"	P	Rynchospora sp. "Beak Rush"	Y4
P. amplifolias "Largeleaf Pondweed"	P1	Cladium sp. "Twig Rush" or "Sawgrass"	Y5
P. crispus "Curlyleaf Pondweed"	P2		
P. richardsonii "Richardson Pondweed"	P3	Carex sp.	X
P. robbinsii "Flatleaf Pondweed"	P4		
P. epihydrus "Ribbonleaf Pondweed"	P5	Scirpus sp. "Bulrush"	B
P. sp. "Thin-leaved Pondweed"	P6	S. validus "Softstem Bulrush"	B1
P. gramineus "Grassleaf Pondweed"	P7	S. cyperinus "Woolgrass Bulrush"	B2
P. natans "Floatingleaf Pondweed"	P8	S. americanus "American Bulrush"	B3
P. vaseyi "Vasey's Pondweed"	P9	S. atrovirens "Dark-green Bulrush"	B4
P. capillaceus "Pondweed"	P10	S. subterminalis	B5
P. folisus "Leafy Pondweed"	P11		
P. tenuifolius "Pondweed"	P12	Eleocharis sp. "Spike Rush"	E
P. perfoliatus "Redhead Grass"	P13	E. acicularis "Needle Spike Rush"	E1
P. pusillus "Slender Pondweed" or "Baby Pondweed"	P14	E. smallii "Spike Rush"	E2
P. spirillus "Snailseed Pondweed"	P15	E. palustris "Common Spike Rush"	E3

P. pectinatus "Sago Pondweed"	P16			
P. illinoensis "Illinois Pondweed"	P17	Peltandra virginica "Arrow Arum"	a1
P. pulcher "Heartleaf Pondweed"	P18	Calla palustris "Water Arum"	a2
P. bicupulatus "Snailseed Pondweed"	P19	Orontium aquaticum "Golden Club"	a3
P. zosteriformis "Flatstem Pondweed"	P20	Acorus calamus "Sweet Flag"	a4
P. nodosus	P21		
P. oakesianus	P22		
Spirodela polyrhiza "Big Duckweed"	L1	Subularia aquatica "Awlwort"	M1
Wolffia sp. "Watermeal"	L2	Neobeckia aquatica "Lake Cress"	M2
Wolffiella floridana "Florida Wolffiella"	L3	Cardamine sp. "Bitter Cress"	M3
Lemna sp. "Duckweed"	L4	Rorippa sp. "Water Cress"	M4
L. minor "Common Duckweed"	L5		
L. trisulca "Star Duckweed"	L6	Podostenum sp. "River Weed"	r
Xyris sp. "Yellow-eyed Grass"	e	Callitriche sp. "Water Starwort"	k1
Eriocaulon sp. "Pipewort"	e1	Elatine sp. "Waterwort"	k2
E. septangulare "Pipewort"	e2	Viola sp. "Violet"	k3
Heteranthera dubia "Mud Plantain"	W1	Hypericum sp. "St. John's-wort"	k4
Pontederia cordata "Pickerelweed"	W2	H. boreale f. callitrichoides "St. John's-wort"	k5
P. cordata forma taenia "Pickerelweed"	W3		
		Decodon verticillatus "Swamp Loosestrife"	V1
Iris sp. "Iris"	j1	Trapa natans "Water Chestnut"	V2
Juncus sp. "Rush"	j2	Ludwigia sp. "False Loosestrife"	V3
Saururus cernuus "Lizard's tail"	j3	Lythrum salicaria "Purple or Spiked Loosestrife"	V4
		Rhexia virginica "Virginia Meadow-beauty"	V5
Rumex sp. "Dock"	Q1	Hippuris vulgaris "Mare's-tail"	h1
Polygonum sp. "Smartweed"	Q2	Prosperinaca sp. "Mermaid Weed"	h2
		Myriophyllum sp. "Water Milfoil	h3
Salix sp. "Willow"	b1	M. heterophyllum "Broadleaf Water Milfoil"	h4
Myrica gale "Sweet Gale"	b2	M. humile "Water Milfoil"	h5
Alnus sp. "Alder"	b3	M. tenellum "Leafless Milfoil"	h6
Nyssa sp. "Sour Gum" or "Tupelo"	b4	M. spicatum	h7
Cornus sp. "Dogwood"	b5		
Chamaedaphne calyculata "Leatherleaf"	b6	Sium suave "Water Parsnip"	f1
Fraxinus sp. "Ash"	b7	Hydrocotyle sp. "Water Pennywort"	f2
Cephalanthus occidentalis "Buttonbush"	b8	Cicuta sp. "Water Hemlock"	f3
Ilex verticillata "Virginia Winterberry" or "Black Alder"	b9		
Clethra alnifolia "Sweet Pepperbush"	b10	Hottonia inflata "Featherfoil"	m1
		Samolus sp. "Water Pimpernel"	m2
Ceratophyllum sp. "Coontail"	C	Lysimachia sp. "Loosestrife"	m3
Ceratophyllum demersum "Coontail"	C1	L. ciliata "Loosestrife"	m4
C. echinatum	C2		
		Nymphoides cordatum "Floating Heart"	g1
Nymphaea sp. "Water Lily"	N1	Asclepias sp. "Milkweed"	g2
N. odorata "Fragrant Water Lily"	N2	Myosotis sp. "Forget-me-not"	g3
N. tuberosa "White Water Lily"	N3		
Nuphar sp. "Yellow Water Lily", or "Spatterdock"	N5	Stachys sp. "Hedge Nettle"	t1
N. variegatum "Painted Cow Lily"	N6	Scutellaria sp. "Skullcap"	t2
		Physostegia sp. "False Dragonhead"	t3

Brasenia schreberi "Water Shield"	n1
Nelumbo lutea "American Lotus"	n2
Cabomba caroliniana "Fanwort"	n3
Caltha palustris "Marsh Marigold"	R1
Myosurus minimus "Mousetail"	R2
Ranunculus sp. "Buttercup" or "Crowfoot"	R3
Bacopa sp. "Water Hyssop"	F1
Limosella sp. "Mudwort"	F2
Veronica sp. "Speedwell"	F3
Chelone sp. "Turtlehead"	F4
Mimulus sp. "Monkey Flower"	F5
Lindernia sp. "False Pimpernel"	F6
Gratiola sp. "Hedge Hyssop"	F7
G. virginiana "Hedge Hyssop"	F8
Lobelia sp.	O
L. cardinalis "Cardinal Flower"	O1
L. dortmanna "Water Lobelia"	O2

Lycopus sp. "Water Horehound"	t4
Mentha sp. "Mint"	t5
Solanum dulcamara "Nightshade"	t6
Utricularia sp. "Bladderwort"	U
U. vulgaris "Common Bladderwort"	U1
U. purpurea "Purple Bladderwort"	U2
U. radiata "Floating Bladderwort"	U3
U. intermedia "Flat-leaved Bladderwort"	U4
Megalodonta beckii "Water Marigold"	Z1
Eupatorium sp. "Joe-pye Weed"	Z2
Bidens sp. "Bur Marigold", "Beggar-ticks",	Z3
Helenium sp. "Sneezeweed"	Z4
Solidago sp. "Goldenrod"	Z5
Aster sp. "Aster"	Z6
Coreopis rosea "Pink Tickseed"	Z7
Equisetum sp. "Horsetail"	i
E. fluviatile "Swamp or Water Horsetail"	i1
Drosera rotundifolia "Roundleaf Sundew"	D
Vaccinium sp. "Cranberry"	d
Phragmites sp. "Reed Grass"	q

Appendix II Duplicates Result

Nutrient Criteria, Lakes (2003) (QC Status: 4) Exported: 10/13/2005 4:02:25 PM Duplicates.

Fort Pond (PALIS: 81046)
Unique_ID: W0603 Station: ~deep hole
Description: [Fort Pond, Lancaster.]

Date	OWMID	QAQC	Time	Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	--	--	(24hr)	(m)	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
8/11/2003	LC-0184	LC-0185	10:55	--	--	--	--	--	##* m	15*
8/11/2003	LC-0185	LC-0184	10:55	--	--	--	--	--	##* m	<15*
8/11/2003	LC-0188	LC-0281	11:50	0 - 7.0	4.1*	--	--	--	--	--
8/11/2003	LC-0281	LC-0188	11:52	0 - 7.0	4.1*	--	--	--	--	--
Relative	*Percent*	*Difference*			*0.0%*	--	--	--	--	*0.0%*

Partridge Pond (PALIS: 81098)
Unique_ID: W1088 Station: A
Description: [deep hole, northern end, Westminster]

Date	OWMID	QAQC	Time	Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	--	--	(24hr)	(m)	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
9/8/2003	LC-0193	LC-0194	11:30	0 - **	3.9*	--	--	--	--	--
9/8/2003	LC-0194	LC-0193	11:40	0 - **	4.3*	--	--	--	--	--
Relative	*Percent*	*Difference*			*9.8%*	--	--	--	--	--

CATACOONAMUG BROOK/Lake Shirley (SARIS: 8144525) (PALIS: 81122)
Unique_ID: W1089 Station: A, Mile Point: 3.096
Description: [deep hole, southeastern lobe, Lunenburg]

Date	OWMID	QAQC	Time	Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	--	--	(24hr)	(m)	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
9/16/2003	LC-0198	LC-0199	11:26	--	--	<0.02	--	## bh	0.019	19*
9/16/2003	LC-0199	LC-0198	11:26	--	--	<0.02	--	## bh	0.022	19*
Relative	*Percent*	*Difference*			--	*0.0%*	--	--	*14.6%*	*0.0%*

TMDL Baseline Lakes (2003) (QC Status: 4) Exported: 10/13/2005 4:02:26 PM Duplicates

NASHUA RIVER/Pepperell Pond (SARIS: 8143500) (PALIS: 81167)
Unique_ID: W1074 Station: A, Mile Point: 4.343
Description: [deep hole, Pepperell]

Date	OWMID	QAQC	Time	Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
	--	--	(24hr)	(m)	mg/m3	mg/L	mg/L	mg/L	mg/L	mg/L	PCU
7/15/2003	LB-2510	LB-2511	10:41	--	--	--	--	--	--	##* m	28*
7/15/2003	LB-2511	LB-2510	10:41	--	--	--	--	--	--	##* m	31*
Relative	*Percent*	*Difference*			--	--	--	--	--	--	*10.2%*
8/13/2003	LB-2682	LB-2683	10:10	0 - 3.0	3.9*	--	--	--	--	--	--
8/13/2003	LB-2683	LB-2682	10:12	0 - 3.0	3.7*	--	--	--	--	--	--
Relative	*Percent*	*Difference*			*5.3%*	--	--	--	--	--	--
9/16/2003	LB-2546	LB-2547	14:15	0 - 6.0	1.9*	--	--	--	--	--	--
9/16/2003	LB-2547	LB-2546	14:15	0 - 6.0	1.4*	--	--	--	--	--	--
Relative	*Percent*	*Difference*			*30.3%*	--	--	--	--	--	--

Sample-Specific Data Qualifiers:

“ a ” = accuracy as estimated at WES Lab via matrix spikes, PT sample recoveries, internal check standards and lab-fortified blanks did not meet project data quality objectives identified for program or in QAPP.

“ b ” = blank Contamination in lab reagant blanks and/or field blank samples (indicating possible bias high and false positives).

“ d ” = precision of field duplicates (as RPD) did not meet project data quality objectives identified for program or in QAPP. Batched samples may also be affected.

“ e ” = not theoretically possible. Specifically, used for bacteria data where colonies per unit volume for e-coli bacteria > fecal coliform bacteria, for lake Secchi and station depth data where a specific Secchi depth is greater than the reported station depth, and for other incongruous or conflicting results.

“ f ” = frequency of quality control duplicates did not meet data quality objectives identified for program or in QAPP.

“ h ” = holding time violation (usually indicating possible bias low)

“ j ” = ‘estimated’ value; used for lab-related issues where certain lab QC criteria are not met and re-testing is not possible (as identified by the WES lab only). Also used to report sample data where the sample concentration is less than the ‘reporting’ limit or RDL and greater than the method detection limit or MDL (mdl< x <rdl). Also used to note where values have been reported at levels less than the mdl.

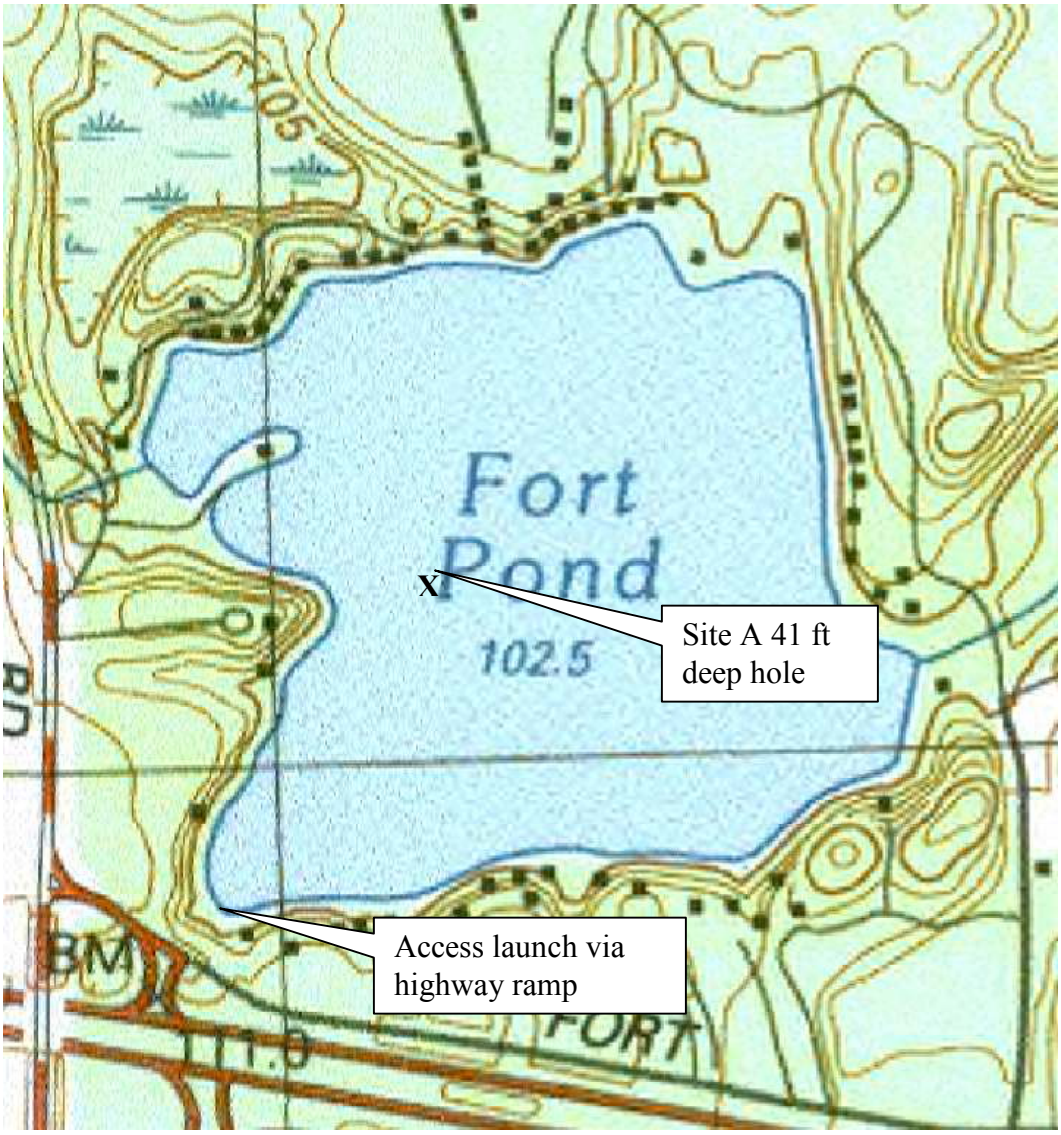
“ m ” = method SOP not followed, only partially implemented or not implemented at all, due to complications with sample matrix (eg. sediment in sample, floc formation), lab error (eg. cross-contamination between samples), additional steps taken by the lab to deal with matrix complications, lost/unanalyzed samples, and missing data.

“ p ” = samples not preserved per SOP or analytical method requirements.

“ r ” = samples collected may not be representative of actual field conditions, including the possibility of “outlier” data and flow-limited conditions (e.g., pooled).

Key to data codes:
“ ## ” = Censored data; “ ** ” = Missing data; “ -- ” =No data; “*” =other lab;
SymTyp: Sample Type- VDOR= Van Dorn; DINT= Depth integrated by vertical hose; MNGR= Manual Grab; NR= not recorded.

Appendix IV. Local Environs Maps in Palis order.

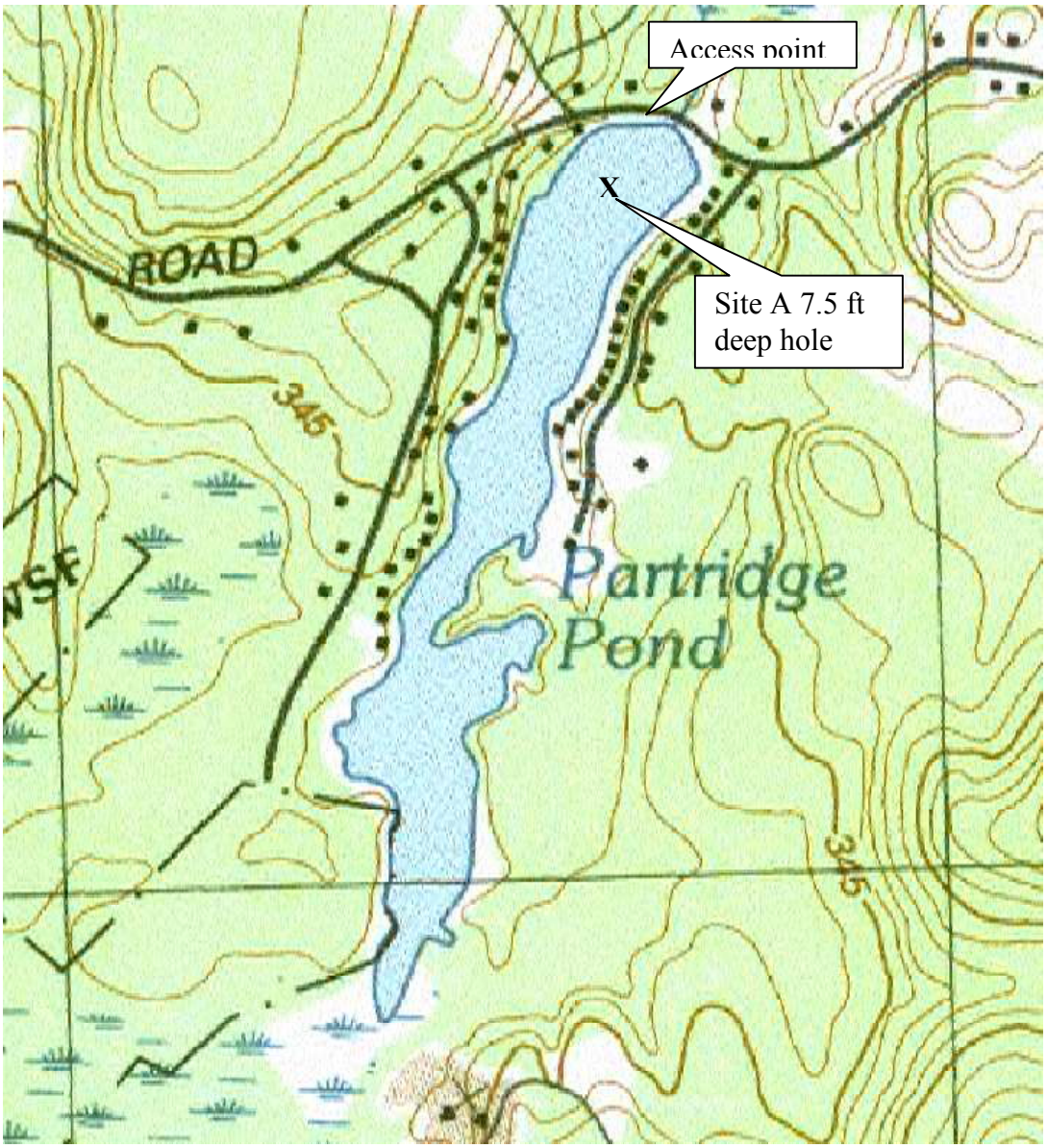


N

Fort Pond
Lancaster
81046

70 0 70 140 Meters

300 0 300 600 Feet



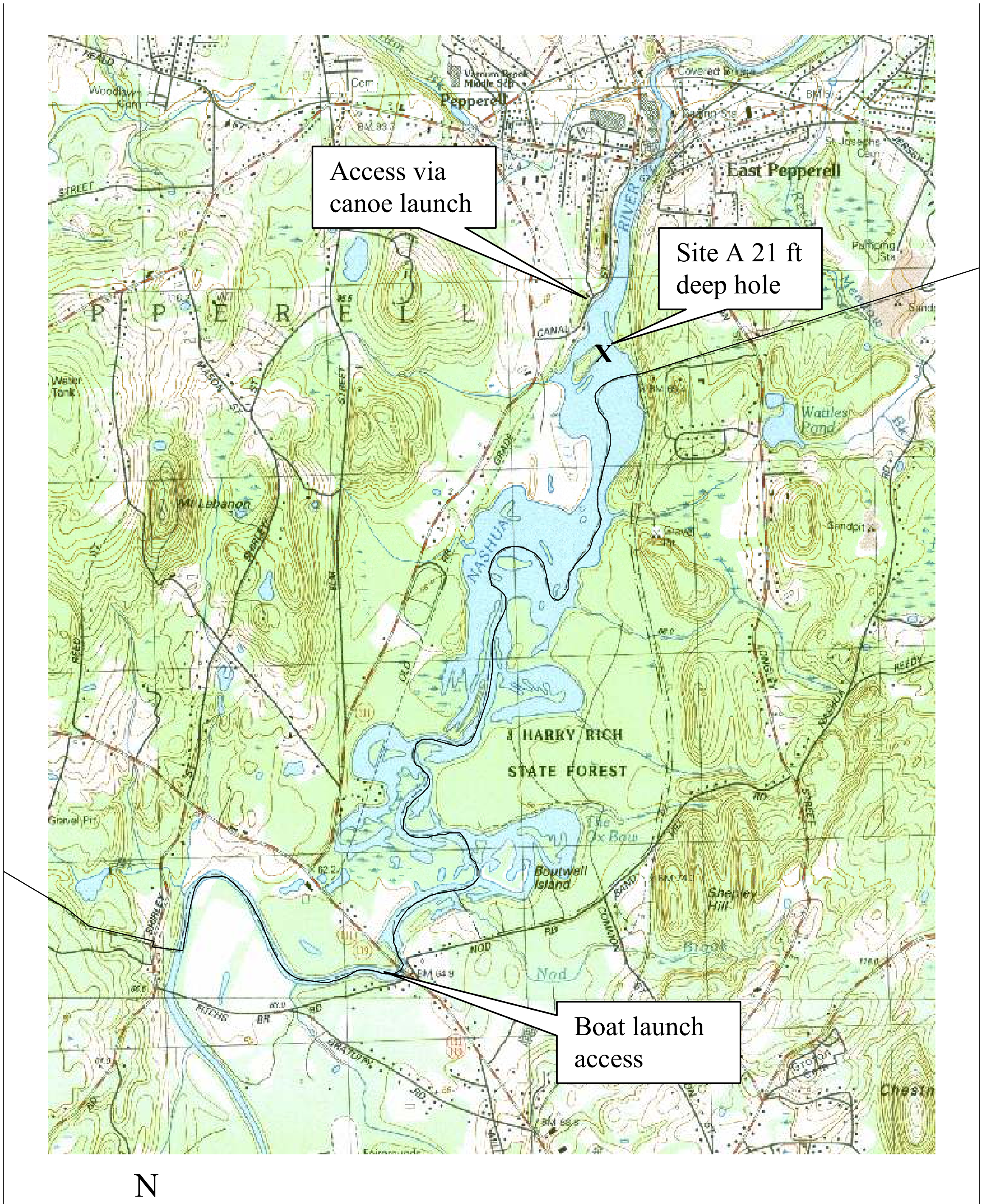
N

Partridge Pond
Westminster
81098

70 0 70 140 Meters

300 0 300 600 Feet


HILL
RD
FLAT
RD
Long Swamp
Robbs Hill
Lake Shirley
Site A 36 ft deep hole
X
Brook
ROUND
Gravel Pits
N
200 0 200 400 Meters
700 0 700 1400 Feet
Lake Shirley
Lunenburg
81122



N

Pepperell Pond
Pepperell
81167

200 0 200400 Meters

2000 0 2000 4000 Feet